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CZOTSCHER: W1.2096

[Specification]

Control Method and Device and Method for Setting Up a Control System

CROSS-REFERENCE TO RELATED APPLICATIONS

[001]   This patent application is the U.S. national phase, under 35 USC 371, of PCT/DE2003/004099, filed December 11, 2003; published as WO 2004/055609 A2 and A3 on July 1, 2004, and claiming priority to DE 102 58 704.3, filed December 16, 2002, and to DE 103 17 065.0, filed April 14, 2003, the disclosure of which are expressly incorporated herein by reference.

FIELD OF THE INVENTION

[002]   The present invention is directed [relates] to a method and to a device for control, as well as to a method for setting up a control system [in accordance with the preambles of claims 1, 2, or 29 or 36]. The control system is intended primarily to be used in conjunction with a printing press.

BACKGROUND OF THE INVENTION

[003]   DE 37 07 866 A1 discloses a control device for use with several units

of a printing press. Values, which are [, wherein values] measured at the units, are

supplied to a computer unit, are stored in a memory and are made visible at a

touch display screen. The direct control of the units is made possible by the use

[means] of the touch screen and the computer unit.

[004]   A digital system for use in regulating and controlling a power

converter and drive mechanisms is known from the publication "Siemens Energie

& Automation 8 (1986) Heft 2", pages 119 and 120. A [, wherein a] regulating and

control device is designed by the use [means] of design software, instead of being

programmed. The designed regulation and control functions of this [one]

regulating device are translated into a list code. The [, the] application program is

processed, together with the system software, by the regulating and control

device. The regulating device is designed in a structural image-oriented design

language of required hardware and software components, as discussed at

[(]pages 121 to 123[)] of the above-identified publication.

[005]   A system for the rapid digital regulation and control of power

converter drive mechanisms is disclosed in the above mentioned publication on

pages 112 to 115. The [, wherein the] hardware and software is constructed in

modular structures, as discussed at [(]pages 116 to 118[)].

[006]   DE 197 40 974 A1 discloses a book production system with a

program having an object structure and a memory, in which, inter alia, information

regarding the machinery contained in the installation, as well as setting

parameters, are stored. To manufacture a defined product, the setting parameters required [destined] for this product are output to the control of the machine by the program by the use [means] of the data stored in the data bank.

[007]   A system for transmitting OPC data via the internet to an OPC server of an automating system is known from DE 100 36 552 A1.

[008]   An article by Wolfgang Weber "Verteilte Systeme - Verteilte Objekte - DCOM" [Distributed Systems - Distributed Objects - DCOM] presented at a seminar on data processing WS 1989/99 of the Ruhr University at Bochum, Chair for Data Processing, deals with the employment of DCOM running time systems in connection with the communication between several different computers and processes.

[009]   In an [the] article entitled "Useware in der Praxis: Die DICOweb Bedienung - ein Beispiel für eine ergonomische Gestaltung in der Drucktechnik" [Useware Actually Employed: DICOweb Operation - an Example of an Ergonomic Design in Printing Technology] by Gregor Enke, 44 (2002), an operating concept for a printing press is introduced. The concept provides a manipulation-oriented operation in the course of the product preparation and the influencing of process values.

SUMMARY OF THE INVENTION

[0010]   The object of the present invention is directed to providing [based on creating] a method and a control system, as well as a method for setting up a

control system.

[0011]   In accordance with the present invention, this object is attained by [means of the characteristics of claims 1, 2, or 29 or 36] the provisions of a device for controlling a printing press. The printing press includes several units. These units are controlled by a common control system which has a central data memory in which actual values are stored in the form of process variables.

[0012]   The advantages to be gained by [means of] the present invention consist, in particular, in that for one the architecture of the control system is constructed in a decentralized manner in such a way that it supports a modular and a flexible construction or design of the processing machine.

[0013]   Simultaneously, there is a central data management device whose structure is adapted from the existing configuration of the processing machine, or which reflects it. This [, which] makes possible a simple, centralized configuration across distributed systems.

[0014]   The central data management system and/or the architecture of the control system in accordance with the present invention, form a scaleable system. In this way, the individual steps for processing the data can be scaled on a single computer or across several computers, depending on the application case and/or the workload. Therefore, the system, and in particular the software and the hardware of the system, covers a large spectrum of different types and sizes of machines, such as, [(]for example, printing presses for newspapers, jobbing,

sheets, securities and the like [etc.)]. The software, or the data inventory of the control system, is configured as a function of the type of application, such as, for example, being designed from predefined modules and data inventories[, in particular designed]. Separate programming of data of each individual configuration can be omitted. Only [, only] the design of the control system with previously known components to correspond with the installation takes place. The modular architecture and the type of planning and implementation can be advantageously expanded to installations with several sections.

[0015]   Regarding the variability and the flexible application for the most diverse machine types, the standardized, almost automated design of the control system, and in particular of the data memory, is of particular advantage. The program portion of the data server, which is identical to a large extent, except with [in] regard to different types of machines, forms the machine- specific structure in the data server actually on the basis of a data set describing the installation, i.e. the data server only receives its identity, [()for example through its memory element which was previously "empty", with [) in] respect to the installation to be controlled, and is set up accordingly. This set-up of the base structure can be followed during the later operation, in the course of operating the installation, by a change of applied parameter specifications and/or an activation or a deactivation of basically provided components, or units. In what follows, a differentiation will be made between the implementation, [()i.e. between the data or software

configuration[)] of the machine-specific data structure into the control system, and an adaptation, to be made during the running of the installation, to the product to be manufactured, which adaptations are, in part, also called "configuring" or "setting-up" in the prior art. For example, control console computers, or their memories, have a fixedly programmed identifier space when the installation is being delivered. With [, for example, while with] the present system, there is a freely programmable identifier space, whose data structure, [-] for example by implementing the config files, [-] is only then set up. For this purpose, the data server has a process on the one side, and on the other side has the config file, which is characterizing the installation.

[0016]   In an advantageous embodiment of the control console in accordance with the present invention, the control console [it] has an operating console which makes it possible for the operator to recognize the colors of the actual side and to change them. In a further development of the invention, the values for regulating and for controlling the machine can be directly changed or can be input by the use [means] of a touch screen-capable display field at the display screen.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]   Preferred [Exemplary] embodiments of the present invention are represented in the drawings and will be described in greater detail in what follows.

Shown are in:

Fig. 1, a schematic installation with a control device, <u>in</u>

Fig. 2, a schematic representation of the design of an installation <u>in</u>

<u>accordance with the present invention</u>, <u>in</u>

Fig. 3, a schematic representation of the architecture of the control

device <u>of the present invention</u>, <u>and in</u>

Fig. 4, a schematic representation of the architecture of a multi-

section installation <u>in accordance with the present invention</u>.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0018]   An installation 01, <u>such as,</u> for example, a printing press 01 or <u>a</u>

printing press installation 01 as represented in Fig. 1, has a number of units 02,

03, 04, for example installation elements for performing defined method steps,

such as a material supply device 02, [(]for example a roll changer 02, or several

roll changers 02.1, 02.2, 02.3, [etc.),] printing units of printing towers 03, units 04

for further processing, such as folding apparatus 04, <u>and the like</u> [etc]. In turn,

<u>each of</u> the printing units 03 can have several lower-order units 05, <u>such as,</u> for

example printing groups 05, [for example] identified by 05.1, 05.2, 05.3, 05.4, etc.

The different units 02, 03, 04, 05 can each be provided once or several times in

the installation. The number and/or <u>the</u> embodiment of the <u>several</u> units 02, 03,

04, 05 can be different for different embodiments of the installation.

[0019]   The installation 01 furthermore has a symbolically represented

control system 06, which controls the units 02, 03, 04, 05, or <u>which controls</u> their

drive mechanisms, settings, etc. individually and in the interaction between each

other. The [Inter alia, the] symbolically represented control system 06 contains, as

will be explained in detail below, various elements, such as one or several

memories, one or several computing units, as well as signal connections between

the elements, such as data busses and/or protocol converters, for example. The

control system 06 is in a signal connection, such as, for example via connections

07, with the units 02, 03, 04, 05. Alternatively, the control system 06 is in signal

connection [or, if provided,] with controls 08 and/or with regulating elements 08

assigned to these units [them].

[0020]   Depending on its [the] type, configuration [design] or application,

such an installation 01 is differently configured with respect to [regarding] its units

02, 03, 04, 05, with respect to the [respective] number of units and/or with respect

to the detailed specification of the hardware of the units themselves. This means

that this invention relates, for example, to a jobbing printing press with a defined

number of roll changers [()of a defined type()], to a defined number of printing

groups in a horizontal arrangement [()of a defined type()], to a folding apparatus

[()of a defined type()], and the like [etc]. In connection with the hardware, it is

intended here to understand that the configuration of the installation 01 is the

actual configuration [design] of the installation with actually provided units 02, 03,

04, 05, and possibly their design.

[0021]   Information regarding the actual [such a] configuration of the entire,

actually existing installation 01 is centrally stored, with the corresponding data, in the control system 06. The data is [are] preferably centrally stored in a centralized data management device 09, such as, for example a memory 09 or a data server 09. In an advantageous embodiment, these data [([for configuring the installation[)] can be implemented and/or can be changed via at least one input interface 11. In an advantageous embodiment of the present invention, the data for configuring the installation are provided as a data set F, [([for example a file F, in particular configuration file F[)] by the use [means] of a data processing unit 16, which is independent of the control system 06, for example a computer 16 and, following their completion, are transmitted via the input interface 11 to the central data management device 09, or are implemented there. The preparation of the configuration file F is used for the mapping by use [means] of control technology of the actual installation configuration and will be understood in what follows as "projecting" the control system 06 in view of the actually existing installation 01, or its units 02, 03, 04, 05. For example, the transmission of the file F can also take place from the manufacturer via a network [by the manufacturer], such as, for example, via the internet. However, the control system 06 can also have its own mechanism [means] for projecting the control system 06, or for the preparation of the data set F which, for example, substantially correspond to those of the data bank and/or the surface which is explained in greater detail below.

[0022]   The mapping of the configuration in a configuration file F, i.e. the

projection of the control, takes place, in an advantageous embodiment of the

present invention, by using a memory unit 17, and in particular by using a data

bank 17, with a stock of pre-known or predefined objects 12, 13, 14, which objects

[for example] are, for example, assigned to printing press types and/or to

embodiments of the above mentioned units 02, 03, 04, 05. The installation 01,

such as, for example, a printing press 01, is then projected in such a way that it is

put together from the stock of predefined objects 12, 13, 14, such as, [(]for

example, printing towers, roll changers, folding apparatus, etc.[)], wherein the

data, or [(]at least the basic data[)], properties and/or sub-programs, which are

required for later operation of the installation 01, are assigned to these objects 12,

13, 14, or are allotted to them by selection. For example, these specific data and

sub-programs are present in the data bank 17 and are linked to the respective

object 12, 13, 14. More complex objects 12, 13, 14 at least contain the possibility

of further details, in which lower-order objects 13.1, 13.2, for example specific

variants, specific embodiments, details, specific settings, etc., here for the

example of a "printing unit1", "printing group1" and printing group2", on a lower

level are assigned to the objects 12, 13, 14, for example in the manner of a tree

structure or a register structure.

[0023]   Further details can exist on more than one lower level in the tree

structure, as represented in Fig. 2, for the example of the printing unit 03 with

"lateral registration" and with "circumferential registration", as 13.2.1, 13.2.2. A

further, not specifically [further] identified level represents, for example,

"parameters", with still lower located "parameter1" and "parameter2". Basic data

and/or basic sub-programs are assigned to all these specifications in the data

bank 17 which, when selecting the appropriate object 12, 13, 14, [(]with sub-

specification, lower-order objects, etc.[)], are transferred to a data set F. Data, or

finally selected parameters, can be differently selected for different units 02, 03, 04

of the same type, or can be predetermined by being entered. As represented, by

way of example in Fig. 2, the installation 01, which is to be projected, [(]by the use

[means] of software technology[)], has three roll changers 02, two printing units 03,

as well as a folding apparatus 04. The [, wherein the] parameters from the object

stock 19, which are schematically represented on the right side of the figure, are

assigned to each unit 02, 03, 04, 05. Following the selection of the

components/objects intended for the installation 01, all of the assigned data,

[(]parameters[)]/sub- programs, are transferred, in accordance with a predefined

pattern, to a data set F or to a file F, such as, [(]for example, a "config file" F[)].

This data set F then represents a map of the installation 01 which is actually to be

operated and then has, for example, all of the preset values, preset command

variables, and the like which are [etc.] essential for the operation and control and

which can be available either in text or in binary format.

[0024]   In an advantageous embodiment of the invention, the projection is

performed on the data processing unit 16 which unit 16 is independent from [of]

the control system 06 or which can be separated from it, for example on a

computer 16. In this case, an embodiment of the invention is of advantage

wherein a program surface 18 has a linkage with the above mentioned data bank

17 in such a way that a selection or a copy of an object 12, 13, 14, [(]or of its

identification or name[)] also contains the specific data or parameters and/or sub-

programs and/or sub-objects 13.1, 13.2 and [(]furthermore also the process

variables 12, 13, 14, 13.1, 13.2, 13.2.2, 13.2.2[) -] in a manner comparable to the

embedding of an OLE object. An embodiment of the program surface is

particularly easy to use, by the use [means] of which objects 12, 13, 14 offered in

an object stock 19 in a tree structure can be further differentiated by selection, and

the objects 12, 13, 14, or the detailed objects 13.1, 13.2 can be supplied by

copying, in particular by "drag and drop", to the installation to be projected in the

form of its own display screen area 21. In the background of this operation, or at

the end of it, the data and procedures assigned to these objects 12, 13, 14 with

lower-order objects 13.1, 13.2, etc. are copied, [-] for example in a

predeterminable standard format, [-] to the data set F. The file F, which is created

on the basis of the selected process variables 12, 13, 14, 13.1, 13.2, 13.2.2,

13.2.2, can now be fed, after its completion, to the control system 06 of the

installation 01, and in particular to the data server 09. The file F [It] contains, for

example, application names predetermined by the user, [-] and preferably

standardized, [-] as variables.

[0025]   For one, a data processing operation, [()or a data processing

routine[)] has been advantageously implemented in the data memory 09, which

operation or routine is intended [designed] to produce a data structure by the use

[means] of projection data which, for another, are available to it. In the present

case, the configuration file F which had been transferred to it, is available to the

data memory 09, by the use [means] of which a software-related configuration or

[()establishment[)] of the memory takes place, which is custom- made for the

installation 01 that is mapped by the file F. This means that following the

transmission of the configuration file F into the data memory 09, first a data

structure is created, which is matched to the installation 01, instead of merely

filling an already fixedly programmed memory environment of open parameters

with data. Such a fixedly programmed memory environment would have to be

individually programmed to a large extent for each machine type and/or for every

more extensively differing configuration of the hardware. Because [By means] of

the advantageous design of the data memory 09 with a data processing operation

and a configuration file F assigned to each other, the custom-made configuration

[design] of the data structure, and, in the end, of the control system 06, is possible,

in a simple way. The actual installation 01 is mapped in accordance with fixedly

predetermined routines of the data processing operation by use [means] of the file

F, containing [()process variables 12, 13, 14, 13.1, 13.2, 13.2.2, 13.2.2[)], in the

data memory 09 or in the control system 06. Only then is the data and program

structure formed as a system of the data memory 09 as such.

[0026]   The advantage of this double solution is that, on the one hand, procedures, actions, behavior and/or logical connections have been set up for the software portion and for the higher-order control processes. On [and, on] the other hand, the configuration data of the file F defines the components and the sub-routines of the actually existing installation 01. In this way, changes or error corrections of the "hardware" can be achieved solely by implementing a new file F, and improvements or error corrections of the data processing operation can be achieved solely by implementing a portion of, or the entire data processing operation. For example, in case of an additional unit or of a replacement unit of a new type, it is only necessary to read in a new config file F for the new installation 01, taking this change into consideration. The [, the] program portion of the data server 09 recognizes the mapped installation 01 and adjusts its memory area and, if required, also adjusts other components of the control system 06, accordingly. In this case, no change in the program source codes, with [in] respect to parametrization, routines, etc., needs to be made. The program portion, or the [(]data processing operation[)], is designed in such a way that the data structure and the functionality of the installation 01, regarding different machine types, is formed solely by [means of] the available config file F.

[0027]   The above-described projection goes far beyond the conventional programming of a control console computer or a section computer wherein,

although the installation 01 is also mapped by software, the routines and the

program source codes containing the parametrization are, in a manner tightly

matched to the machine, fixedly programmed in the respective computer unit. The

installation 01 can then be operated via an operator interface. This [, this] means

that customarily already entered components can be switched on and off by use

[means] of software, parameters can be changed, and the like [etc]. In the prior

art, this is also sometimes called "configuring the installation 01", but means the

selection of components and/or parameters which are already fixedly set in the

program, and not the "configuration by use [means] of software" of the data server

09 or of the control system 06 in the manner which is called "projecting" here. In

contrast to the so-called "configuration of the installation 01", wherein the

operating data in a fixedly preset data structure are selected and are thereby

"configured", with the present way of operating, the data structure of the data

server 09 itself is configured, i.e. the data server 09 itself is designed so it can be

configured or [(]projected[)]. Projection is to be understood as the mapping of the

actually existing units, [-] and only these units, [-] in an appropriate data structure.

[0028]   In an advantageous embodiment of the present invention, it has, of

course, been provided that, following the projection and the implementation of the

file F, the operators can switch units, which are implemented through an interface

15, off or on, or can change parameter values via a control level 41, as will be

described [(see] below[)], and/or a partially or fully automated system, [(]such as a

product planning system[)], i.e. can perform a so-called "configuration of the installation 01" in the above mentioned way from the units now entered in the data server 09.

[0029]   In an advantageous further development of the present invention, in the course of projecting the installation 01, communication-specific information, such as, [(]for example, interface protocols used[)], regarding the units 02, 03, 04, 05, and, if required, regarding the hardware components of the control system 06 used, are read out of the object stock. In a first variation, this [these] data can be integrated in the config file F, can also be implemented in the data server 09 and can be fed from there to a communication server 23, which will be explained in greater detail below, for its "configuration by use [means] of software". In an embodiment of the invention, which is indicated by dashed lines in Figs. 2 and 3, for the configuration by use [means] of software of the communication server 23 in the course of the projection, at least one second file F', such as, for example, configuration file F', or [-] config file F' for short, is established, which second file is either indirectly implemented in the communication server 23 via the data server 09, or via an interface, which is, not specifically represented, of the communication server 23. Communication-specific information regarding the projected units 02, 03, 04, 05 is then available to the latter.

[0030]   A systematy, leading away from a one-time production, is created by the procedure and by the embodiment for setting up the control system 06, which

can be used in connection with the most diverse products of a manufacturer of the installation 01, such as, for example, different types, product lines and configuration [design] or equipment stages, in a manner which is uncomplicated [simple] and which is low in errors. The person projecting the control system 06 by the use [means] of the planned installation 01, no longer needs to perform detailed programming, custom-tailored to the installation 01, but instead only maps the components or the units 02, 03, 04, 05 of the installation 01. Programming takes place by taking in the data regarding the object stock 19, the implementation in the data server 09, as well as the program portion of the data server 09 which is substantially constant regarding the different types, product lines and design or equipment stages.

[0031]   The data memory 09 is advantageously configured [designed] as a data server 09 with an open interface, and in particular is configured as a data server 09, or as an [()OPC data server[)], with at least one open OPC interface 15 for data exchange on the basis of OLE/COM and DCOM. The data memory 09 manages the objects or the process variables 12, 13, 14, 13.1, 13.2, 13.2.2, 13.2.2 on the basis of an object management, for example in accordance with the COM (component object model)/DCOM (distributed component object model) standard. This means that it has an operating system which supports a method for inter-process communication, or an [()object request mediator[)], which is configured [designed] to exchange complex data structures. In the example, the operating

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system is provided in the form of Windows NT4.0$^{(R)}$, [(]or higher[)], or Windows

2000$^{(R)}$, [(]or higher[)] and as standard for COM/DCOM communication. However,

it can also be a comparable combination of <u>an</u> operating system and <u>an</u> object

request mediator meeting the above mentioned conditions, for example the

operating system LINUX$^{(R)}$ and the standard CORBA$^{(R)}$, <u>can be used</u>. This <u>also</u>

[equally] applies to the element <u>to be</u> described in what follows, for which the use

of Windows 2000$^{(R)}$ together with COM/DCOM has been called advantageous or a

requirement.

[0032]   The data can be exchanged via the open interface 15 in accordance

with the data exchange method OLE<u>, or</u> [(]object linking and embedding[)], for

example with a network, <u>a</u> field bus, an application and/or a visualization. The at

least one open OPC interface 15 allows access by <u>use</u> [means] of a further

external unit 20, module 20 or application 20, [(]for example of a dryer, a print pre-

stage and/or a roll supply[)], <u>also</u> called <u>a</u> "consumer" in what follows[,] in that it is

brought into contact <u>with, and</u> is connected with the data server 09. The additional

consumer "helps itself" autonomously to the data from the data server 09.

[0033]   The objects, or <u>the</u> process variables 12, 13, 14, 13.1, 13.2, 13.2.2,

13.2.2 are mapped by the data server 09 in an identifier space and <u>are</u> managed.

The administration can consist, for example, of memorizing, archiving and

reconstructing process data and process variables 12, 13, 14, 13.1, 13.2, 13.2.2,

13.2.2. The identifier space is now specifically configured to correspond to the

projected installation 01, particularly again in a tree structure. The data server 09

can additionally be configured [designed] so that errors which are detected in the

control and/or in the regulation of the installation 01 are entered in a data set, such

as, for example, a so-called log file.

[0034]   In an advantageous embodiment of the present invention, the data

server 09 is integrated into an architecture for the control system 06, as will be

explained in what follows, and as seen in [(]Fig. 3[)].

[0035]   The data server 09 is connected, via a further interface and a signal

connection 22, such as, for example, via a network 22, with at least one process or

computing unit 23, for example a server 23, and in particular with a communication

server 23. With [In] regard to the control system 06 with decentralized

components, such as, [(]for example, with lower-order processes 24 and/or

controls 08, as discussed [see] below[)], the process or computing unit 23

represents a higher- order process or computing unit 23. In it, a conversion of the

so-called raw data, which was made available by the data server 09, into the

communications protocol [respectively] demanded for the lower-order processes

24 and/or the controls 08, respectively takes place in it in a higher-order process.

The network 22 between the data server 09 and the higher-order process or

computing unit 23 is, for example, configured [designed] as an ethernet with a

transmission rate of at least 10 Mbit/s, for example. Unless stated differently, a

"network" is understood to be a closed network in accordance with hardware

technology of a uniform net type. In an advantageous embodiment of the

invention, a stochastic access method, and in particular, the CSMA/CD access

method, standardized in accordance with IEEE 802.3, is used as the access

method. In principle, the communication can be based on diverse protocols, but in

accordance with an advantageous embodiment of the present invention on the

TCP/IP protocol or a socket connection.

[0036]   The communication server 23 is generally understood to be a

process unit 23, which is a mediating layer between the server 23 and the

network-specific processes which are located "below" it. For example, the server

23 here functions as client, [(]OLE or COM/DCOM client[)], which can pick up

objects or process variables 12, 13, 14, 13.1, 13.2, 13.2.2, 13.2.2 from the data

server 09, or [(]OLE server[)]. It receives and/or processes the objects or the

process variables 12, 13, 14, 13.1, 13.2, 13.2.2, 13.2.2 also on the basis of an

object management in accordance with the COM/DCOM standard and is machine-

specifically configured. The communication server receives the machine-specific

configuration, for example in the above mentioned way, through the projected

config file F'.

[0037]   Thus, the server 23 forms a "communication layer" between the data

server 09 and clients which are located "below it". These clients can be, for

example, one or several controls 08 which may be combined into one or into

several networks 28 and which are connected, for example, via appropriate

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interfaces 27 or nodes 27, with the respective network 28 or with the signal

connection 28. The server 23 constructs, for example, a direct signal connection,

which is [(]not specifically represented[)], with these controls 08 used as

communication partners, or maintains that connection [it]. On the one hand, the

server [it] interprets data or work order or [(]"jobs"[)] received from the control 08

and transfers these data to the data server 09. On the other hand, it converts data

to be transmitted from the data server 09 into jobs and transmits these to the

respective one of the controls 08. The controls 08 can be configured [designed]

as programs running on a PC, as SPS units, or in another way. The job receives,

from the server 23, the information regarding the node 27 affected by the job, for

example in the head of the respective network protocol.

[0038]   The signal connections 28 are advantageously configured [designed]

as one or more networks 28. They can lead in a star shape, [(]as represented in

star topology[)], to the controls 08, or in a manner which is [(]not specifically

represented[)], each can serve several controls 08 in a bus or ring structure.

[0039]   The network 28 is embodied, in an advantageous manner, as a

network 28 with a deterministic access method, which is, in particular, based on

token-passing, such as, for example, as an arc net 28. In this case, the server is

embodied for converting the jobs into the protocol used. If the network 28 is

embodied as an arc net 28, the communication server 23 is configured [designed]

as an arc net server. In an advantageous variation of the present invention, the

connection 28 can also be configured [designed] as a so-called "profi bus system".

[0040]   In the preferred [exemplary] embodiment of the present invention, as

shown in Fig. 3, the server 23 is not in a direct signal connection with the controls

08, but instead, in an advantageous manner, is in connection via several lower-

order processes 24 or data processing and/or computer units 24, specifically three

in this depicted configuration [case]. The processes 24, [()or also the process

units 24()] can be housed, as represented in Fig. 3, in separate units 24.1, 24.2,

24.3, 24.4, [()i.e. in their own processors, such as, in particular, communication

processors, or even in their own housings or computers()], or in a common

component, such as, for example, a computer. The processes 24 are embodied to

serve a network of a defined type and constitute so-called "net handlers" 24. The

net handlers 24 are interchangeable and can be embodied depending on the net

type to be served, such as, [()for example, profi bus, interbus-S or real time

ethernet()]. Net handlers 24 of several different types can also be connected at

the same time with the server 23. For example, in the depiction in Fig. 3, the three

net handlers 24.1, 24.2, 24.3 can be configured [designed] as arc net handlers,

while an additional net handler 24.4 supports another net type and/or another

protocol, for example, in order to communicate with units, or with their controls 08,

on the basis of this net type and/or protocol.

[0041]   A connection 29 between the server 23 and the lower- order data

processing and/or computing units 24 is configured [designed], for example, as a

network 29, here in star topology. The information as to which node 27 is in a

signal connection 29 with which lower-order data processing and/or computing unit

24, or [()processes 24[)], for example, has been implemented in the server 23.

The information is then sent, for example in the manner of a "switch", to the lower-

order process 24 concerned. In a variation, all of the information is sent to all of

the lower-order processes 24, wherein acceptance and further processing is

decided, for example, by use [means] of the information in the protocol head. The

information regarding which control 08 is to be addressed over which lower-order

data processing and/or computing unit 24 or [()process 24[)], can be implemented

in the lower-order control 08 itself and can be changed.

[0042]   In the example depicted in Fig. 3, the network 28 is embodied

between the lower-order data processing and/or computing unit 24 and the

connected control 08 as a network 28 in star topology. The lower-order data

processing and/or computing unit 24 is configured [designed], for example, as

server 24 with COM/DCOM object management. In a further development, each

server 24 contains a program 31, configured [designed] as a driver 31, or as driver

software 31, which supports the operating system NT4.0[(R)], [()or higher[)], or

Windows 2000[(R)], [()or higher[)]. In this way, object-oriented processing, with

COM/DCOM object management, is made possible on all levels, [()corresponding

to the above mentioned LINUX/CORBA or comparable system[),]. A switch 33, a

so-called switch 33 or a switching hub, can be arranged downstream of the data

processing and/or the computing unit 24, which switch 33 evaluates the target

address of the data packet, [(]here the control 08 or the node 27 concerned[)], and

passes the data packet on specifically only to this control.

[0043]   In addition to the general connection between the data server 09 and

the individual controls 08, logical connections 32 between the controls 08 with

"short" logical paths are provided as [(]cross communication[)]. These are used

for communication during the control process, in which no jobs are needed from

the data server 09.

[0044]   The represented architecture now makes it [now] possible to

configure the installation 01 in a simple manner during planning, or to project the

control system 06 corresponding to the installation 01, and to implement the

resulting settings and data via the data server 09 for the operation. The

embodiment of the present invention, with several lower-order data processing

and/or computing units 24, makes it possible to couple the different controls 08

freely and arbitrarily to one of these data processing and/or computing units 24,

[(]and to store this information there, if required[)]. Depending on the load,

possibly in connection with interferences, or in the course of expanding the

installation 01, the controls 08 can be assigned to the different, or to one data

processing and/or computing unit 24 to be expanded, or to a further process 24.

Therefore, the concept of the present invention can be freely upwardly scaled. If

the installation 01 is in the planning stage, it is [already] possible, in the course of

projecting, to decide on the number of the lower-order data processing and/or computing units 24 or [(]net handlers 24, for example as arc net handlers[)], as well as the intended assignment of the controls 08, and to already take them into consideration in the file F, [(]or in a separate configuration file for the data processing and/or computing units 24[)]. A presetting is then already implemented in the server 23 and/or the net handlers 24, which presetting is simultaneously taken into consideration in the network plans for the connections. It is of particular advantage that, independently of the multitude of the units 02, 03, 04, 05, all of the basic settings, the actual values needed for control and the new command variables of a section are implemented in the common server 23, or changed data are stored there. The control level 41, as well as the lower-order systems, can always access this data stock via the represented architecture.

[0045]   In a further development of the present invention, as represented in Fig. 4, the previously mentioned concept can be expanded to an installation 01 with several sections 34, [i.e.] basically machines 34, which can be operated independently of each other. In this application, the installation 01 has several data servers 09, for example one for each machine 34 or section 34. The data servers 09 are each connected via network[(]s[)] 29, such as an [(]ethernet, in the present example[)], with a communication server 23. Further lower-order data processing and/or computing units 24 or [(]net handlers 24[)], which are not specifically represented here, can be assigned to each communication server 23.

The controls 08 are again in signal connection with the communication server 23, either [(]directly or via a lower- order net handler 24[)] via a network 28. In the subject example, a second network 36 for each [per] machine 34 is provided, into which second network 36 further control[-] or operation-relevant devices 37, 38, 39 can be integrated.

[0046]   The data processing units 23, which are [(]here depicted as arc net servers 23[)], are in signal connection 32 with each other for communication. It has furthermore been provided in accordance with the present invention that a section-overlapping information exchange between the various data servers 09 and the communication servers 23 takes place on a control level 41 of the installation. As in the example in accordance with Fig. 3, it is furthermore provided that a cross-communication 32 between the controls 08 within a section 34, and/or in a section-overlapping manner, can take place on the level between the communication servers 23 and the controls 08.

[0047]   The control level 41 of the installation 01 is symbolically [(in dashed lines)] indicated in Fig. 3 in dashed lines above the control system 06. The components of the control level 41 are a control console 42, 43, 44, which, for example, has at least a computing or a data processing unit 42, such as a [(]control console computer 42[)], a visualization device 43, such as a [(]display screen 43[)], as well as an operating console 44. The control console 42, 43, 44 is used for the communication of the operators with the installation 01, or with a

section 34 of the installation 01. The control console 42, 43, 44, or portions of the control console 42, 43, 44, are in signal connection with the data server 23, for example via an open OPC interface in accordance with the above explanations.

[0048]   While preferred embodiments of a control method and device and method for setting up a control system, in accordance with the present invention, have been set forth fully and completely hereinabove, it will be apparent to one of skill in the art that various changes in, for example the specific types of printing presses, their drive mechanisms and the like could be made without departing from the true spirit and scope of the present invention which is accordingly to be limited only by the appended claims.

[0049]   What is claimed is:

[List of Reference Symbols

01	Installation, printing press, printing press installation
02	Unit, material feeding device, roll changer
02.1	Roll changer
02.2	Roll changer
02.3	Roll changer
03	Unit, printing unit, print tower
04	Unit for further processing, folding apparatus
05	Unit, printing group
05.1	Printing group
05.2	Printing group
05.3	Printing group
05.4	Printing group
06	Control system
07	Connection
08	Control regulation, communication partner
09	Centralized data management, data memory, data server
10	-
11	Input interface
12	Object, process variable
13	Object, process variable
13.1	Lower-order object, process variable
13.2	Lower-order object, process variable
13.2.1	Further detail, process variable
13.2.2	Further detail, process variable
14	Object, process variable]

[15	Interface, open, OPC interface
16	Data processing unit, computer
17	Data bank
18	Program surface
19	Object stock
20	Unit, module, application
21	Display screen area
22	Signal connection, network
23	Process or computing unit, server, communication server, process unit
24	Lower-order process, data processing and/or computing unit, net handler, server, process unit
24.1	Lower-order process, data processing and/or computing unit, net handler, server
24.2	Lower-order process, data processing and/or computing unit, net handler, server
24.3	Lower-order process, data processing and/or computing unit, net handler, server
24.4	Lower-order process, data processing and/or computing unit, net handler, server
25	-
26	-
27	Interface, node
28	Signal connection, network, arc net
29	Signal connection, network
30	-
31	Driver, program, driver software
32	Logical connection, cross communication
33	Switch
34	Section, machine]

[35   –

  36   Network

  37   Control-/operating-relevant device

  38   Control-/operating-relevant device

  39   Control-/operating-relevant device

  40   –

  41   Control level

  42   Computing and data processing unit, control
              console computer

  43   Visualization, display screen

  44   Operating console

  F   Data set, file, config file.]